

THE LIFE HISTORY OF PHLÆOTHRIPS (HOPLANDROTHRIPS) SYCAMORENSIS (MASON)

(Thysanoptera, Phlæothripidæ)

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The abundance of *Phlæothrips* (*Hoplandrothrips*) *sycamorensis* (Mason) on the London plane tree, *Platanus acerifolia*, on the University of California campus in Berkeley suggested an investigation of the life history of this species. This study was carried on during the past winter from November to April, inclusive. The thrips were kept in small Stender dishes and fed on fresh green bark. Some difficulty was experienced in maintaining the first instar larvæ alive, but the later stages were rather easily reared.

According to Bailey (1938, Pan-Pac. Ent., 14:19-23) the taxonomy of this species is in doubt, although it plainly belongs in the genus *Phlæothrips* Haliday. Mason (1926, Pan-Pac. Ent., 2:155-7) described the species from sycamore trees at Springville, California, and stated that the larvæ are "light yellow to colorless" and that the winter is passed in the egg stage. The present observations indicate that he may have confused the life history with that of another species, possibly *Karnyothrips flavipes* (Jones), as suggested by Bailey (*in litt.*). The writer takes pleasure in acknowledging the assistance rendered by Dr. S. F. Bailey.

The metamorphosis of this species of thrips follows the pattern outlined for phlæothripid Thysanoptera by Priesner (1927, *Thysanopteren Europas*, Lf. III:484). The eggs are white, faintly reticulate and subellipsoidal (0.27 mm. x 0.17 mm.) with tapering micropylar end. Several days prior to eclosion the embryo may be seen within the egg with the red eye spots near the micropyle. Eggs are found in masses under loose bark, particularly around growth or leaf scars. Females deposit their eggs singly over a period of several weeks, and although the generations overlap, the period of maximum egg abundance during these observations was in early February. Under laboratory conditions the egg stage required about twelve days, but during the cool winter months under natural conditions, it lasted as long as three weeks.

When freshly hatched, the first instar larvæ are about 0.6 mm. in length with the terminal setæ of the abdominal tube

nearly as long as the body. The antennæ, dorsal thickenings of the thorax and tube are grey, while the rest of the body, except for the scarlet-red eyes, is transparent. In about a day a contrasting scarlet coloration appears in the form of a wide pleural band extending from the prothorax to the ninth abdominal segment and in irregular patches on the dorsal area of the thorax. The dorsum of the abdomen and the entire venter of the body are pale yellow. Before molting, the primary larvæ reach a length of about 1.2 mm. Under laboratory conditions, where the length of the stages was determined, the first instar requires about eleven days and is the most active stadium of the thrips.

The first and second instar larvæ may be conveniently separated by the shape of the third antennal segment which is about 1.4 times as long as its greatest width in the former and about 2.3 in the latter. The second larval stadium lasts four to five weeks, depending in part on the abundance of food and the humidity. The larvæ vary in length from 1.4 to 2.0 mm. The antennæ and tube are fuscous, the legs pale fuscous and the head flavotestaceous. Each thoracic tergum bears a broad crimson patch. No other changes from that described for the first instar appear during this active feeding stage.

The prepupal stage of *P. sycamorensis* (averaging 1.5 mm. in length and lasting for two to three days) is readily distinguished by its short horn-like antennæ. The scarlet markings are broader than in the preceding stage, tending to form complete rings around the prothorax and posterior abdominal segments. The antennæ, legs and tube are nearly transparent, while the rest of the body appears as in earlier stages. The prepupæ are sluggish and do not feed.

The first pupa, which is about the same size as the preceding instar, is characterized by the reflexed antennæ about as long as the head and by the wing pads which reach to the anterior margin of the second abdominal segment. The red pigmentation is reduced to discontinuous lateral maculations. The first pupa molts in two or three days. The second pupal stage differs from the first by the longer antennæ which extend to the middle of the prothorax and by the wing pads which reach to the third abdominal segment. It is somewhat larger (about 1.9 mm. long) and the more pronounced scarlet pigmentation is in the form of discontinuous bands on the dorsal and lateral areas of the body. The compound eyes are noticeably larger than in the first pupa. The second pupal period lasts from five to

seven days. The pupæ of both stages secrete themselves in crevices under the bark and do not feed.

In the freshly emerged adult the antennæ, head and legs are nearly transparent and the rest of the body ferruginous. The development of the black cuticular color takes place during the first day and as readily in darkness as in sunlight. In the laboratory eggs were deposited one week after the adults had emerged. The total life cycle of this species of *Phlæothrips*, from egg to egg, lasts approximately eleven weeks, seven of which are spent in feeding stages.

The larvæ and adults are negatively phototropic and when crawling or feeding on the outside of the trunk gather on the shady side of the tree. They are more active in warmer weather and very few specimens were found moving about until the leaves appeared. Some are to be seen on the larger branches but the writer could discover only a few adults and larvæ on the leaves.

Among the natural enemies may be listed a species of *Cephalothrips*, predaceous upon the eggs and larvæ and an anthocorid bug (identified by Dr. R. L. Usinger as *Xylocoris* sp.) preying on all stages. Several common species of ladybird beetles, *Chilocorus bivulnerus* Muls., *Adalia bipunctata* (Linn.) and *Lindorus lophanthæ* (Blaisdell) were present in thrips colonies and fed on the larvæ in the laboratory. Mites were observed feeding on the yolk within partly ruptured egg shells, but none was seen to actually pierce the eggs.

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The Pacific Coast Entomological Society has recently received, through Mrs. Carl A. Richmond, a gift of securities valued at one thousand dollars from the estate of the late Henry Clinton Fall. This fund is to be known as the Henry Clinton Fall Memorial Publication Fund and is to be administered by the Board of Directors of the Society through its Publication Committee. The terms of the bequest generously provide for considerable freedom of action both in the administration of the fund and in the subject matter covered by the publications to which it is applied.

Dr. Fall was a charter member of the Society and served as its first vice-president. The establishment of this fund is a fitting memorial to his long association with the Society and with entomology in California.—E. G. LINSLEY.